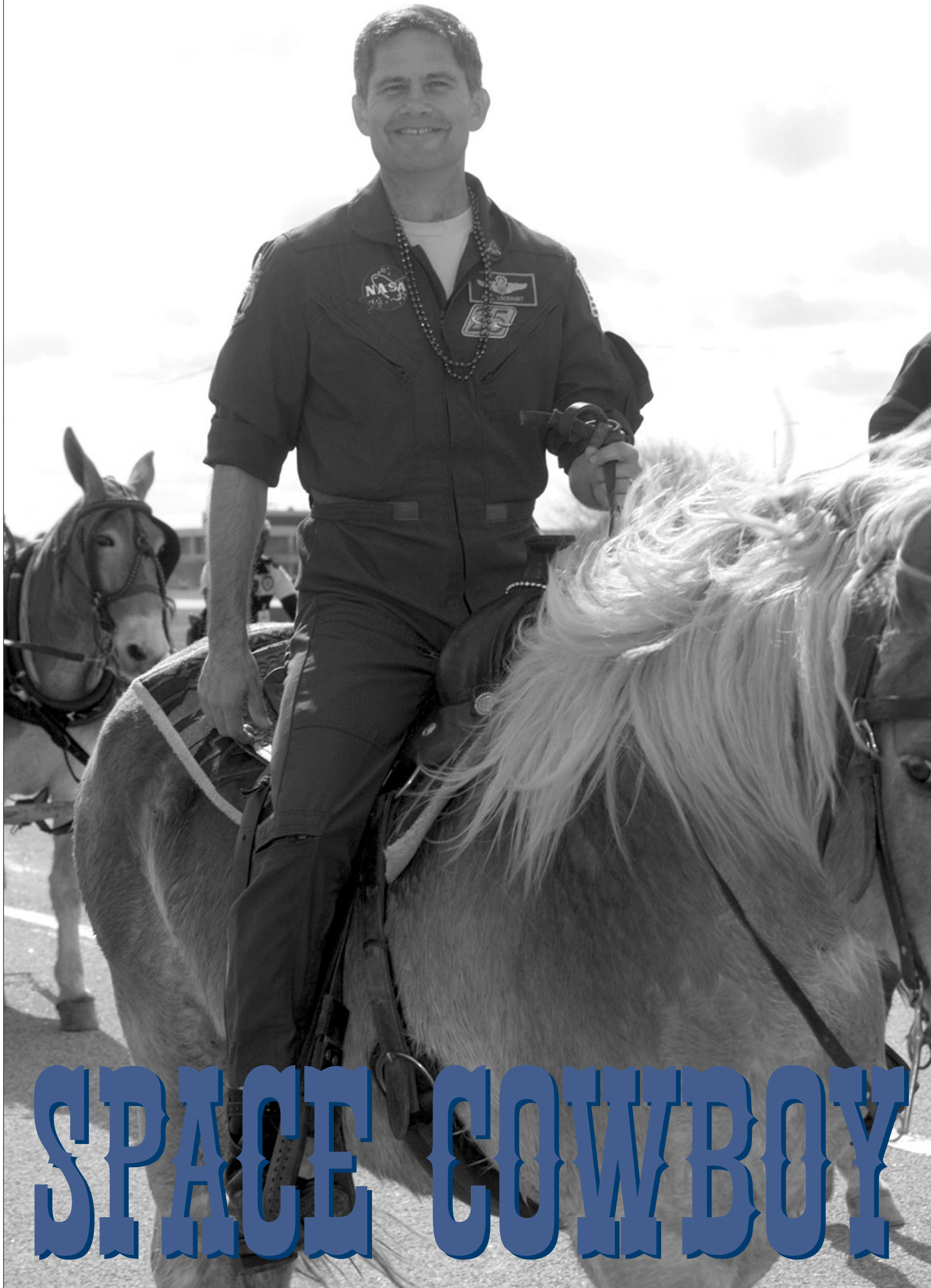


SPACE CENTER

# Roundup

VOL. 42 NO. 4 LYNDON B. JOHNSON SPACE CENTER HOUSTON, TEXAS APRIL 2003



## SPACE COWBOY

NASA JSC 2001e13183 Photo by James Blair

Astronaut Paul Lockhart takes part in the Texas Independence Trailride as it makes its way past Rocket Park. **For more on JSC's involvement with the Houston Livestock Show and Rodeo, please see pages 4 and 5.**



# GUEST COLUMN

By Milt Heflin, Chief of the Flight Director Office



On the afternoon of Feb. 1, 2003, I participated in a news conference describing the events of that morning in Mission Control as we lost the *Columbia* and her crew. I remember very little from the two hours that Space Shuttle Program Director Ron Dittmore and I spent answering questions. I was numb from shock.

I reflected on how this wonderful country of ours responds to crisis and how we always come together to support each other. In my opening remarks, I said: "This is a bad day...I'm glad I work and live in a country where...when we have a bad day, we go fix it."

What I have witnessed since that day reassures me that we will "go fix it."

At the two East Texas field sites I visited – Lufkin/Nacogdoches and Barksdale – I saw a relentless NASA/contractor workforce that stood side by side with local and national organizations – too many to name – along with Mr. and Ms. East Texas. The same spirit was evident at Carswell. All were not just determined but openly eager to be a part of helping us fix it. If people walked away from these locations without feeling good about their fellow human beings or without a lump in their throat or a tear in their eyes – they ain't human.

At home I have seen the NASA/contractor family rally around the Space Shuttle Program leadership of Ron Dittmore, Linda Ham, Ralph Roe and Dave Whittle to establish an in-depth investigation process as part of the program-mandated Mishap Response Team. Dave's work as Chairman of the Mishap Investigation Team, away from home in the field, has been heroic. The work of the NASA and contractor employees on the various investigation teams, including the JSC Emergency Operations Center volunteers that supported the initial collecting of information from the public, has been eye-watering! The *Columbia* Accident Investigation Board is benefiting from the rigor and impeccable integrity by which these teams have done their work – the very foundation that is being used to find out what happened and to build upon to fix it.

International Space Station Program Manager Bill Gerstenmaier's leadership has also been quite evident. He is out in front working with all program elements and our international partners on the very tough issues of maintaining a human presence on the ISS. Bill's upbeat, positive leadership exudes confidence, suggesting that we will overcome any obstacle on our road to recovery from this very tragic loss.

The crew on the ISS is very upbeat with a vigilant team on the ground ensuring their safety and well-being, knowing that the bar has been raised to keep it that way.

And what about our collective JSC family? I can't go anywhere onsite without seeing folks very focused on doing their jobs and doing them well. I can see and feel the determination by just exchanging glances, a handshake, a pat on the back or a hug. It is also quite evident that everybody wants to help in one way or another.

In my opinion, we're all helping. By the nature of our jobs we are supporting human spaceflight. Whether or not you are directly involved in the recovery or investigation, each of us is, and must be, directly accountable and responsible for what we do day in and day out.

I wish to leave you with the "Foundations of Mission Operations." By the way, I don't see these as being unique to my area of work. Rather, I see them as principles that can be applied to many work disciplines – especially now.

1. To instill within ourselves these qualities essential to professional excellence:

- ❖ **Discipline:** Being able to follow as well as to lead, knowing that we must master ourselves before we can master our task.
- ❖ **Competence:** There being no substitute for total preparation and complete dedication, for space will not tolerate the careless or indifferent.
- ❖ **Confidence:** Believing in ourselves as well as others, knowing that we must master fear and hesitation before we can succeed.
- ❖ **Responsibility:** Realizing that it cannot be shifted to others, for it belongs to each of us; we must answer for what we do or fail to do.
- ❖ **Toughness:** Taking a stand when we must; to try again, and again if it means following a more difficult path.
- ❖ **Teamwork:** Respecting and utilizing the abilities of others, realizing that we work toward a common goal, for success depends upon the efforts of all.

2. To always be aware that suddenly and unexpectedly we may find ourselves in a role where our performance has ultimate consequences.

3. To recognize that the greatest error is not to have tried and failed, but that in the trying we do not give it our best effort.

I'm confident that if we adhere to these principles, we can fix anything.

## Center Director Message



## MOVING FORWARD

It's April and we're still in the midst of the *Columbia* accident investigation with all of the inherent theories, rumors and second-guessing by the press. On face value one could think that we are spinning our wheels and going nowhere fast. As a matter of fact, however, we are moving forward.

The *Columbia* Accident Investigation Board is making progress in its quest of the reason for this tragedy. This is not an easy task. The collection of evidence is difficult and painstaking. The subsequent analysis is tedious and time consuming. However, utilizing your and our teammates' expertise, hard work and assistance, they are slowly but surely piecing the facts together and I am confident that they will find the cause. They are moving forward.

On March 16 and 17, the NASA Administrator conducted an off-site meeting with the NASA Leadership Council. The focus was on the future including briefings about the Integrated Financial Management Program, the new Education Outreach programs, the FY 2004 budget, Full Cost Accounting, the Integrated Space Transportation Plan and the Shuttle Return to Flight Initiative. NASA, under the steady hand of Sean O'Keefe, is moving forward.

On March 19 and 20, the Office of Space Flight conducted a summit on the service life extension of the shuttle. In attendance was the entire senior leadership of the Human Space Flight Enterprise including both government and industry members. Agreement was made on the necessary first steps to take in order to safely fly the shuttle past 2020. With Bill Readdy, Associate Administrator for Space Flight in the lead, Human Space Flight is moving forward.

Yes, there are many questions about what it will take to return to flight. Yes, there is still much soul searching about what you or I might have done to prevent the accident. Yes, there is still much grief to endure. Yes, the valiant crew of *Columbia* will always be on our minds. However, to properly honor them and to best serve our Agency and our Nation we must move forward. I know you will give your best as we do.

**Beak sends.....**

FROM THE DESK OF LT. GEN. JEFFERSON D. HOWELL JR.

## People want to know; do you want to tell them?

Johnson Space Center finds itself in a unique position in the wake of our recent tragedy. The public is eager for news from the Center: news about the accident and the investigation, but also about the International Space Station, the Educator Astronaut program and our other projects. Students want to learn about human spaceflight. Taxpayers want to know how NASA benefits them through research and spinoffs.

People want to know; do you want to tell them?

JSC civil servant employees are encouraged to join the Speaker's Bureau, an official NASA organization. Through the Speaker's Bureau, employees become available as speakers to schools, organizational meetings and other groups. If you are interested in joining JSC's chapter of the Speaker's Bureau, please contact Kim Roehm at x34754.

Also, watch for more information about the Speaker's Bureau in the upcoming months, including opportunities for contractor employees to get involved. Help tell JSC's story!

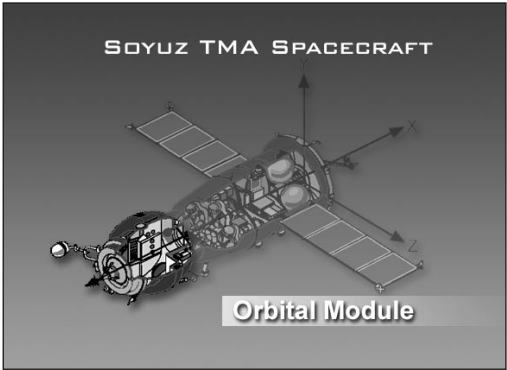


# Soyuz at a glance

By Kendra Ceule

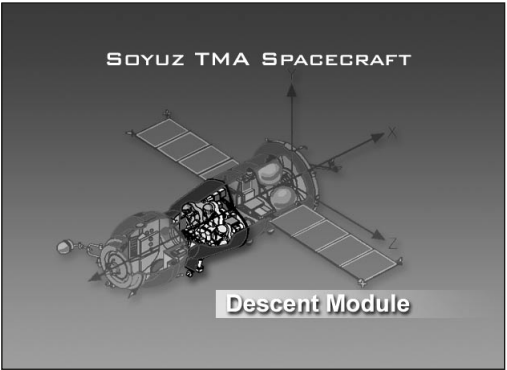
**W**hen the International Space Station's Expedition 6 crew returns to Earth in May, Astronauts Ken Bowersox and Don Pettit will become the first Americans to land in a Russian Soyuz spacecraft. The crew, including Cosmonaut Nikolai Budarin, will make use of the new Soyuz TMA-1 craft that has been docked at the ISS since November. The Soyuz TMA replaced the Soyuz TM spacecraft, which had ferried crewmembers to the Russian space station Mir since 1986, and to the ISS since October 2000. The Soyuz TMA boasts such improvements as more efficient computers, new engines that reduce landing speeds and a color "glass cockpit." In addition, the TMA can accommodate larger individuals than the TM could and can spend roughly twice as long in space.

After being launched aboard a Soyuz rocket, the spacecraft usually takes two days to arrive at the ISS. The Soyuz can rendezvous and dock automatically, although the processes are monitored by the Russian Mission Control Center and the Soyuz crew can intervene for a manual docking if necessary. The spacecraft is broken down into three modules: the Orbital Module, the Descent Module and the Instrumentation/Propulsion Module. See an overview of each section below. "Soyuz continues her legacy as the lifeboat for the ISS and as the transportation vehicles for crews," said Bill Gerstenmaier, ISS Program Manager. "Her service is emblematic of bringing together the best the world has to offer in spaceflight through the ISS partnership." ♦



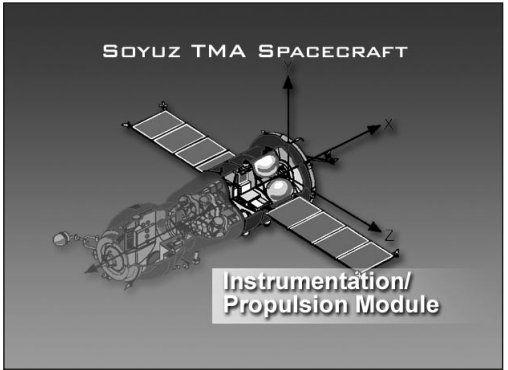
### The Orbital Module...

- ♦ has a volume of 230 cubic feet
- ♦ is used by the crew while on orbit during free-flight
- ♦ contains the docking mechanism and hatch
- ♦ uses antennas to aid in the automated, radar-based docking system
- ♦ has a window



### The Descent Module...

- ♦ has a habitable volume of 141 cubic feet
- ♦ is where the crewmembers sit during launch, reentry and landing
- ♦ is where all controls and displays are located
- ♦ contains life support supplies, batteries and custom-fitted seat liners for each crewmember
- ♦ controls the spacecraft's attitude during descent (until parachute deployment) using its hydrogen peroxide thrusters
- ♦ is the only portion of the Soyuz that survives the return to Earth



### The Instrumentation/Propulsion Module...

- ♦ contains oxygen storage tanks, control thrusters, electronics and communications equipment
- ♦ holds the primary guidance, navigation, control and computer systems
- ♦ is where the Soyuz radiator is located, along with the solar arrays and structural connection to the Soyuz rocket
- ♦ contains the propulsion system, which is used to perform rendezvous, dockings, deorbit burns and any other necessary maneuvers

**Wearing a Russian Sokol suit, cosmonaut Nikolai Budarin, Expedition 6 Flight Engineer, is pictured in a Soyuz spacecraft that is docked to the International Space Station. Astronaut Ken Bowersox, Mission Commander, is visible at lower right.**

NASA JSC ISS006e21115





# JSC gets in the Rodeo spirit

Buses, big-name concerts and barbeque – it must be rodeo time. For about one month every year, Houston plays host to the world's largest rodeo. An event the size and scale of the Houston Livestock Show and Rodeo (HLS&R), which kicked off in late February this year, can't help but make city-slicker Houstonians feel a little like cowboys and cowgirls.

Even astronauts and rocket scientists can be heard giving an occasional "yee-haw!" around rodeo time as Johnson Space Center gets into the spirit.

This year's rodeo activities at JSC included performances in the cafeterias by singers, dancers and rodeo clowns. Rodeo clowns also made appearances at the JSC Child Care Center, where they introduced the children to small animals such as chicks and rabbits.

The Texas Independence Trailride passed through JSC again this year en route to Houston's downtown rodeo parade on Feb. 18. Horses, covered wagons, flags and cowboy hats paraded by

Rocket Park and on to the Gilruth Center, where the trailriders were welcomed by a dinner and dance hosted by the JSC Go Texan Committee.

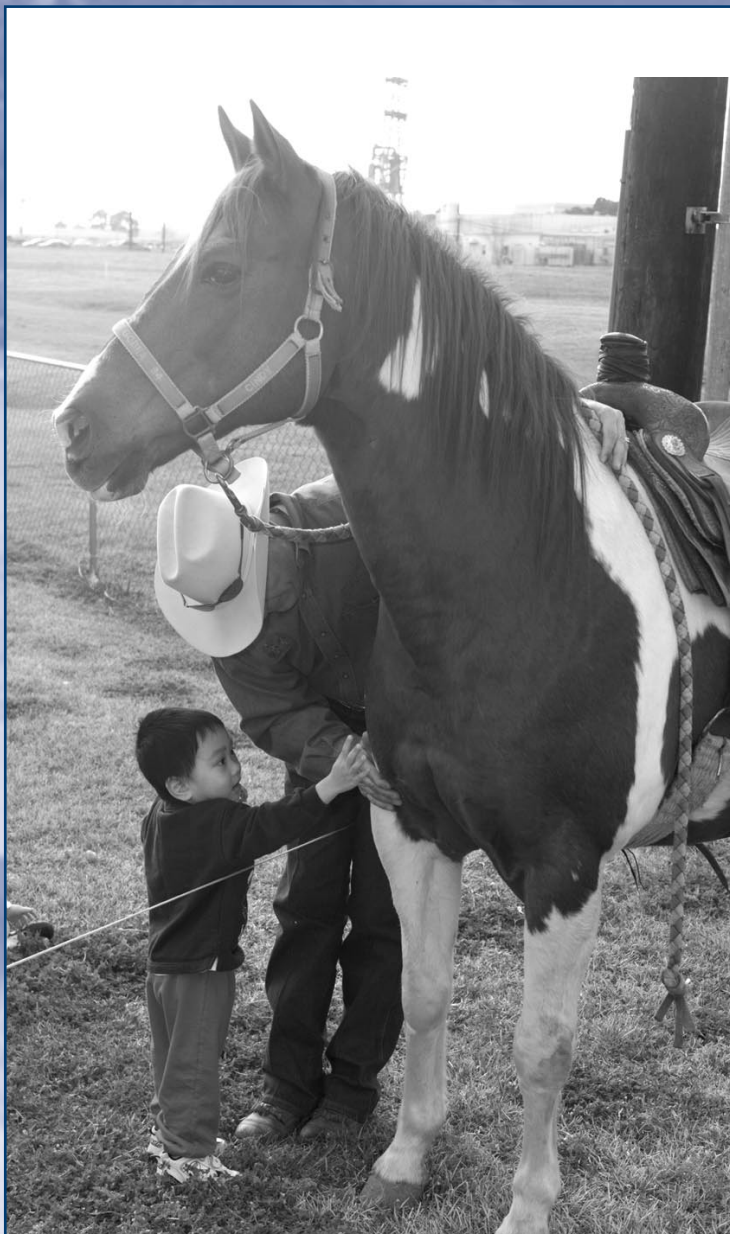
JSC also had a presence at the HLS&R itself for the sixth straight year. The Center's exhibit at the rodeo has steadily increased in size since 1998, and the format of the exhibit has changed as well. The exhibits have included pop-up structures, interactive displays and handouts, and this year's exhibit also included a video tribute to the STS-107 *Columbia* crew. The exhibit brought a taste of the space program to the 1.7 million people who attended the rodeo this year.

## Thank you, rodeo volunteers!

Thank you to all of the volunteers who helped make JSC's rodeo exhibit a success. More than 60 JSC and contractor employees gave their time to serve as exhibit volunteers or shift leads, many of them performing multiple shifts to keep the exhibit staffed.

The volunteers did an excellent job of guiding visitors through the exhibit, creating photo souvenirs with the spacesuit photo-op display, keeping the area clean, distributing NASA handouts and talking with visitors.

In short, the volunteers provided friendly faces at the rodeo and represented the Center admirably. Hats off to the volunteers!



NASA JSC 2003e11035 Photo by James Blair  
**A child at the JSC Child Care Center gets acquainted with a horse, which was brought by during the Texas Independence Trailride.**



NASA JSC 2003e20159 Photo by Robert Markowitz  
**A young visitor to JSC's exhibit at the Houston Livestock Show and Rodeo signs the STS-107 Memorial Book. The book was provided to allow visitors to share their sympathies for the loss of *Columbia* and the STS-107 crew.**



NASA JSC 2003e20158 Photo by Robert Markowitz  
**JSC volunteer Antja Chambers talks with visitors at the rodeo. More than 60 volunteers helped to staff the exhibit over the course of the rodeo.**



NASA JSC 2003e20145 Photo by Robert Markowitz  
**A potential astronaut poses for a shot in the spacesuit photo-op display, which was available at JSC's exhibit at the rodeo.**



NASA JSC 2003e11045 Photo by James Blair  
**A young girl makes friends with a bunny at the JSC Child Care Center.**

Background image: NASA JSC 2003e13174 Photo by James Blair  
**The Texas Independence Trailride passes through JSC en route to Houston's downtown rodeo parade on Feb. 18.**

4  
SPACE CENTER  
**Roundup**

5  
SPACE CENTER  
**Roundup**



# Bringing ONE NASA to financial systems



and NASA Headquarters in using NASA's first integrated financial management system.

The Center is already seeing results from the new system: JSC's Financial Management Division closed the books for the month of February in a record two days, instead of the typical eight days using the legacy systems.

Such efficiency is one of the goals of the Core Financial module, which is the backbone of the Integrated Financial Management Program (IFMP) – the Agencywide effort to streamline and modernize NASA's financial and administrative systems and processes. The Core Financial module gives JSC and the Agency timelier, more consistent and more reliable financial information, and improves accountability to enable future full-cost accounting. It also helps NASA improve its information exchange with customers and stakeholders.

The implementation of such an ambitious project took a lot of cooperation and hard work.

More than 60 JSC Implementation Team members have dedicated the last 11 months to make the goals of Core Financial a reality. To tackle the formidable workload, these civil servants and contractors organized into sub-teams: Project Management, Technical Support, Data Conversion, Process Management, Change Management and Rollout. Project Manager Dot Swanson is quick to share the credit.

"I was fortunate in that I had a fantastic team," said Swanson, "and the help of a great Deputy Project Manager in Carol Harvey. And throughout the project, John Beall, Randy Gish and the JSC Steering Committee gave us the support and resources we needed to be successful." Beall is JSC's Chief Financial Officer, and Gish is Director of Procurement.

The project was rolled out over multiple phases. During the "Understanding" Phase from March 2002 to May 2002, teams worked to assess the scope and complexity of the subsequent "Implementation" Phase. Once Implementation began in June 2002, the teams geared up to

When Johnson Space Center "went live" with the Core Financial system in late February, its 1,080 users joined colleagues from Marshall Space Flight Center, Glenn Research Center, Kennedy Space Center

configure the Core Financial software, design and test the interfaces and prepare for the data conversion. They also began to prepare the end-users by establishing a Center-wide network of Change Agents to support communications, assigning Core Financial roles to users and developing and delivering training based on those roles. The JSC user community deserves its own recognition for its patience and flexibility throughout the implementation.

Since activating all the users, the JSC Implementation Team has provided a variety of Post-Go-Live support processes. These include:

- ❖ The Online Quick Reference tool (OLQR), a Web-based aid with detailed trouble-shooting instructions. The OLQR can be found at <http://olqr-cf.ifmp.nasa.gov>.
- ❖ The Core Financial Live Lab, where users can receive assistance from an experienced user when entering the transactions into the new system. The lab is located in Bldg 12, Room 276; hours are 8:30 a.m. to 5:00 p.m. Monday through Thursday, and until 3 p.m. on Fridays.
- ❖ The IFMP Help Desk, which has been staffed with supplemental experienced users for the period after Go Live. The Help Desk can be reached at (281) 483-9999 or by e-mail at "IFM-SAP Help Desk;" hours are 8 a.m. to 5 p.m. weekdays.

As with any new system implementation of this scope, the Implementation Team and Center Management anticipate that there will be some problems to overcome. However, they also know from experience that when NASA teams work together, there are no issues that they cannot resolve.

The JSC Implementation Team looks forward to June 2004 when the remaining NASA centers go live, and the vision of One NASA is actualized in the Agency's financial systems.

For more information on the IFMP Core Financial Project, onsite employees can visit <http://www4.jsc.nasa.gov/org/la/cfo/ifmp/> and offsite readers can visit <http://ifmp.nasa.gov/>.

## News from White Sands

### NASA's nose: George Aldrich helps avoid smelly situations in space

By Kim Hulsey

Thanks to George Aldrich and his team of NASA sniffers, astronauts can breathe a little bit easier. Aldrich is a Chemical Specialist or "chief sniffer" at the White Sands Test Facility's Molecular Desorption and Analysis Laboratory. His job is to smell items before they can be flown in the space shuttle.

Aldrich explained that smells change in space and that once astronauts are up there, they're stuck with whatever smells are onboard with them.

In space, astronauts aren't able to open the window for extra ventilation, Aldrich said. He also said that it is important not to introduce substances that will change the delicate balance of the climate of the International Space Station and the space shuttle.

More than being merely unpleasant, smells in space can indicate a health threat. Even objects that give off no odor can emit dangerous chemicals by a process called off-gassing. If an object's off-gassing has toxic effects, it can be a matter of life and death.

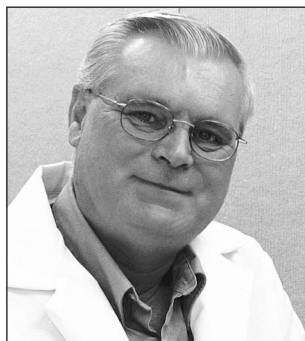
"Smell is brought out by confined spaces and heat," said Aldrich, "yet astronauts have no way of escaping a smell if it becomes pervasive. If that smell comes from dangerous compounds, it's a serious health threat."

It is Aldrich's job to use his sense of smell to ensure the olfactory comfort, as well as the safety, of astronauts on orbit.

#### The science of smelling

When he was just 18 years old, Aldrich began working at WSTF's fire department and was asked to be on the department's Odor Panel. Aldrich explained that one of the requirements to get a job as a sniffer is a lack of any allergies or respiratory problems.

"If you have a lot of allergies, your nasal passages are already irritated and cannot be used," he said. NASA calibrates and certifies its sniffers' noses every four months using a "10-bottle test" in which seven of the bottles have odors and three of them are blanks. The seven scents must be categorized as musky, floral, ethereal, camphoraceous, minty, pungent or putrid.



WSTF 0301-0639  
Photo by Lou Rosales

**George Aldrich is a Chemical Specialist or "chief sniffer" at the White Sands Test Facility's Molecular Desorption and Analysis Laboratory.**

According to the NASAexplores Web site ([www.nasaexplores.com](http://www.nasaexplores.com)), Aldrich's team tests nearly all items that astronauts would encounter during their flight – including fabric, toothpaste, circuit boards, makeup and even the ink on their checklists.

First, the items are tested for toxicity. They are placed into individually sealed containers and then into an oven, which is heated to 120°F for three days to speed up the off-gassing process. The gases are then extracted and tested to determine whether they are toxic or carcinogenic. If the gases are deemed safe, the items then undergo odor testing.

Aldrich and four other team members smell the items and rank them on a scale of zero to four, ranging from non-detectable (zero), to barely detectable, easily detectable, objectionable and offensive (four). Aldrich refers to level four as "get-me-out-of-here." Because the sense of smell can vary from person to person, sniffers give each object their own ratings from which an average is obtained. If an item rates more than a 2.4 on the scale, it fails the test and is not allowed on the flight. Some items that have failed are camera film, felt-tipped markers, mascara and certain types of stuffed animals. Aldrich has done 765 of these "smell missions" to date.

NASA could use dogs or "electronic noses" for this testing, but as Aldrich pointed out, the Agency would rather use human sniffers because they serve as a screening test for the also-human astronauts. The human testers can more accurately identify smells that will offend the human crewmembers than an electronic nose could.

As a result of his career, Aldrich has had some uncommon opportunities. He has served as a judge four times at the Odor-Eaters Rotten Sneaker Competition. He has also appeared on television a number of times, including appearances on two game shows.

While others may chuckle at his unusual occupation, Aldrich said he believes in its value.

"I wouldn't be doing it if I didn't think it was important," he said. ❖



# Don't miss a beat

## AED machines can save lives during cardiac arrest

By Kim Hulsey

Betty Gress would not be alive today if not for the quick actions of her office mates and the availability of an automated external defibrillator (AED).

"I think about how extremely lucky I was to be in a place that had the people with the courage to do what needed to be done and the equipment to do it with," said Gress, Station Flight Manager in Johnson Space Center's Mission Integration and Schedule Management Office. "I know for a fact that I would not be here today if it were not for the AED in the building."

Gress was saved by one of 58 AEDs onsite, and she is one of four such success stories so far here at JSC. AEDs have proven to be invaluable medical tools for the Center since they were brought here about three years ago.

"You make one save and it pays for itself, really," said Russ Tucker. Tucker, a Corporal with the Special Operations Division in Physical Security Support, is a believer in the AED machines.

### What is an AED?

An AED is a device used to administer an electric shock through the chest wall to the heart. This device has proven to be the only effective way to treat sudden cardiac arrest. Built-in computers assess the patient's heart rhythm, judge whether defibrillation is needed and then administer the shock. Audible prompts and lighted indicators guide the user through the process.

Sudden cardiac arrest is so dangerous because it is unpredictable and can happen to anyone – even a child – and many victims have never had any prior heart problems. Sudden cardiac arrest is due to an electrical malfunction in the body, causing the heart to stop beating properly. The heart then becomes an ineffective pump that no longer supplies the body and brain with oxygen.

Within seconds, the victim falls unconscious and has no pulse. Only immediate treatment, such as CPR and the use of an AED, can prevent death. Every minute without treatment decreases survival by 10 percent.

"Early intervention is the key to the chain of survival," said Dr. David Williams, Director of Space and Life Sciences. With AEDs and trained AED operators located throughout JSC property, help can be given in the critical initial two to four minutes when the chance of survival is much higher.

### Who can use the AED?

Most AEDs are designed to be used by non-medical personnel who have received proper training.

"Virtually all of the employees who volunteered to be trained and certified as AED operators have not been a part of any first-response rescue team," said Bob Gaffney, JSC Emergency Preparedness Manager.

AEDs are relatively easy to use, but the operator must know how to recognize the signs of sudden cardiac arrest and when to call JSC's emergency phone numbers. Operators must also be certified in CPR, which stands for cardiopulmonary resuscitation. Early CPR is an integral part of providing lifesaving aid to people suffering sudden cardiac arrest. The ventilation and compressions help to circulate oxygen-rich blood to the brain between shocks.

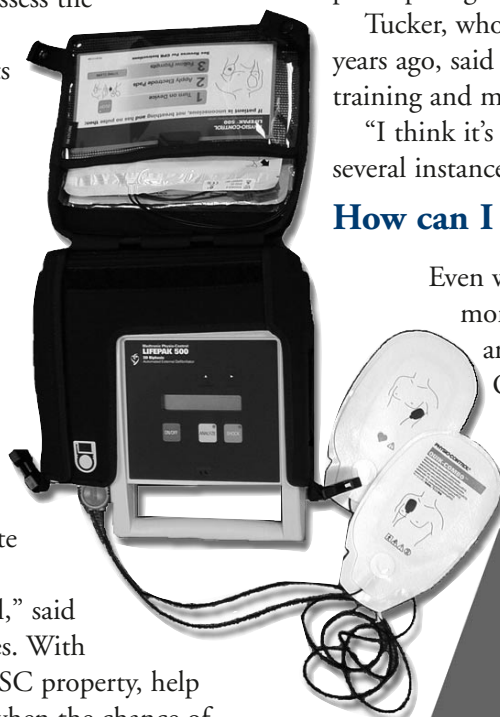
In addition, it is important for operators to receive formal training on the AED model they will be using so that they become familiar with that particular device and can operate it successfully in an emergency. Certified AED operators must commit to maintaining their skills and certification by participating in monthly computer-based refresher training.

Tucker, who used an AED to help save a life at JSC fewer than two years ago, said that the benefits of the program make it well worth all the training and maintenance required.

"I think it's an excellent program," said Tucker. "There have been several instances where people have been brought back."

### How can I volunteer as an AED operator?

Even with more than 500 certified AED operators, JSC still needs more people who are willing to be trained and certified in CPR and the use of AEDs. Interested employees should call the Occupational Health Office at x37896 or Mike Fox in the Human Test Support Group at x25724.



NASA JSC 2002e50930 Photo by Bill Stafford

**Betty Gress, whose life was saved with an AED last year, is pictured with the people who played a role in her rescue. From left to right are: Jeffrey Davis, Director of Space and Life Sciences Directorate; Daniel Sedej, Communication and Tracking Group Lead, training division; Robert Smith, member of the JSC Security Bike Patrol; Gress, Station Flight Manager in the Mission Integration and Schedule Management Office; Michael Prendergast, Flight Manager for the Mission Operations Directorate; and Kimberly Kennedy, Flight Manager for the Mission Operations Directorate.**



# Mars Settlement Design Competition

**I**n just one weekend, more than 100 high-school students departed from Johnson Space Center and traveled 60 years into the future.

Over the weekend of Feb. 21-23, JSC hosted its annual Mars Settlement Design Competition. The competition is an exciting industry simulation game for high-school sophomores, juniors and seniors in the Houston and southeast Texas area.

The competition scenario required the four competing student “companies” to design a base on Mars for almost 19,000 people in the year 2063. The winning students called their “company” Vulture Aviation.

This year 157 students attended the competition along with 15 teachers/chaperones. The students and teachers represented 54 different high schools and 34 school districts.

The driving forces behind the yearly event are Astronaut Bonnie Dunbar, who initiated the competitions at JSC five years ago; Norm Chaffee, InDyne, Inc. Consultant; and Mike Kincaid, Education and Student Programs Branch Chief.

This is the fifth year that JSC has sponsored this competition as part of its educational outreach activities during the National Engineers Week period in February.

In addition to JSC, the competition is sponsored and underwritten by Boeing, Dow, Clear Creek ISD and the Houston section of the American Institute of Aeronautics and Astronautics.

JSC also sponsors a similar competition at the White Sands Test Facility in October of each year. The WSTF competition has been active for four years. ❖



NASA JSC 2003e15030 Photo by Robert Markowitz

**The competition judges discuss the students' proposals. From left are Beatriz Kelly-Serrato, Lockheed Martin Engineer in the Crew and Thermal Systems Division; Kerry Soileau, Aerospace Technologist in the Avionics and Software Office; Shirley Brandt, Hernandez Engineering Scientist Specialist in the Automation, Robotics and Simulation Division and Astronaut Bonnie Dunbar, Assistant Director for University Affairs and Research and founder of the JSC and WSTF competitions.**



NASA JSC 2003e15028 Photo by Robert Markowitz

**Students collaborate to create their proposed Mars bases during the competition.**



NASA JSC 2003e15029 Photo by Robert Markowitz

**Here, high-school students are hard at work planning their proposed Mars bases.**

Background Photo NASA JSC 2003e15031 Photo by Robert Markowitz  
**Participants in the Mars Settlement Design Competition catch up on some much-needed rest.**

## SPACE CENTER Roundup

The *Roundup* is an official publication of the National Aeronautics and Space Administration, Johnson Space Center, Houston, Texas, and is published by the Public Affairs Office for all space center employees. The *Roundup* office is in Bldg. 2, Rm.166A. The mail code is AP121. Visit our Web site at: [www.jsc.nasa.gov/roundup/weekly/](http://www.jsc.nasa.gov/roundup/weekly/)  
For distribution questions or to suggest a story idea, please call (281) 244-6397 or send an e-mail to [roundup@ems.jsc.nasa.gov](mailto:roundup@ems.jsc.nasa.gov).

Editor ..... Kendra Ceule  
Senior Editor ..... Melissa Davis

PRSRT STD  
U.S. POSTAGE  
PAID  
WEBSTER, TX  
Permit No. G27